Chapter Four
AIRPORT ALTERNATIVES

AIRPORT ALTERNATIVES

The preceding three chapters of the master plan have presented the existing airport conditions, forecasts of aviation demand through the year 2020, and an evaluation of future facility needs. The focus of this chapter is to identify alternatives available which will satisfy projected demand through the planning period. These alternatives consider and identify the highest and best uses for airport property while taking into account existing physical constraints and applying appropriate federal standards. As there are a number of possible alternatives, some intuitive judgement must be applied to identify those alternatives that have the greatest potential for implementation. The alternative analysis is a critical step in the planning process because it provides the underlying rationale for the final master plan recommendations.

Any development proposed for a master plan is derived from an analysis of projected demands for a set period of time. The demands were determined using the best methodologies available;

however, it cannot be assumed that future events will not alter these demands. The master planning process attempts to develop a viable final master plan concept which will meet those demands identified in the previous chapter, as well as comply with the goals and objectives of the City of Sierra Vista. In addition, the ultimate plan should be in line with the Joint Use Agreement (outlined in Chapter One) presently in effect with Libby Army Airfield. Once a final master plan concept has been identified, cost estimates will be prepared for the individual projects, a development schedule will be prepared, and potential funding sources will be identified (including projects that are eligible for federal and state funding assistance).

Typically, when updating an existing airport's master plan, three basic conceptual alternatives can be considered. The first involves the transfer of projected aviation demand to other regional airports, or possibly to a new airport site. The second is a "no development" or "do nothing" alternative where the existing airport is left as it is. The third alternative involves a development program within the physical and environmental constraints that exist now and within the foreseeable future. The first two alternatives considerations were deemed undesirable as the City of Sierra Vista has committed to the continued improvement and development of the Airport as a productive contributor to the local and regional economy. The City has recently requested Federal environmental approval for the transfer and development of 203 acres of property located between the existing Sierra Vista Municipal Airport property and State Route (SR) 90, see **Exhibit 4A, Proposed Property Acquisition Area,** in order to support the continued viability of the facility. As such, this chapter focuses on the third alternative, which proposes development within the existing and proposed Airport boundaries.

Each of the airport development alternatives presented in this chapter are based on the assumption that the City will acquire the 203 acres proposed for transfer to the City from the Department of the Army. The transfer, detailed in the document *Environmental Assessment for the Transfer and Development of 203 Acres of Property Adjacent to Sierra Vista Municipal Airport*, is currently under review by both the FAA and Department of Defense (DOD). The project evaluated in the environmental assessment (EA), which was prepared in accordance with the requirements of Section 102(2)(c) of the *National Environmental Policy Act (NEPA) of 1969* (PL 91-190, 42 USC 4321 *et. seq.*) as defined in *FAA Order 5050.4A,* and with Title V of the *Airport and Airway Improvement Act of 1982* (as amended), received a Finding of No Significant Impact.

The Final EA outlines a specific land use mix for the 203 acres. This mix was derived from a market and socioeconomic analysis of the Sierra Vista region with particular consideration given to immediate and long-term demand by direct airport users. **Table 4A, Estimated Development Acreages per Use**, outlines the approved maximum number of acres for the various land uses addressed in the EA. These areas are also roughly illustrated on **Exhibit 4B, Development Scenarios**, which was included in the Final EA. The identification of issues and mitigation measures included in the EA relied on the socioeconomic analysis (including direct, indirect, and induced population and employment impacts) that assumed this breakdown. As a result, the final landside development plan for Sierra Vista Municipal Airport must account for these same acreages and uses in order to ensure consistency with the approved EA. The final plan, however, is not limited to the precise layout illustrated on the exhibit.

The alternative concepts presented in this chapter are provided for the

00-MP-06 svEx4B 06-20-2001

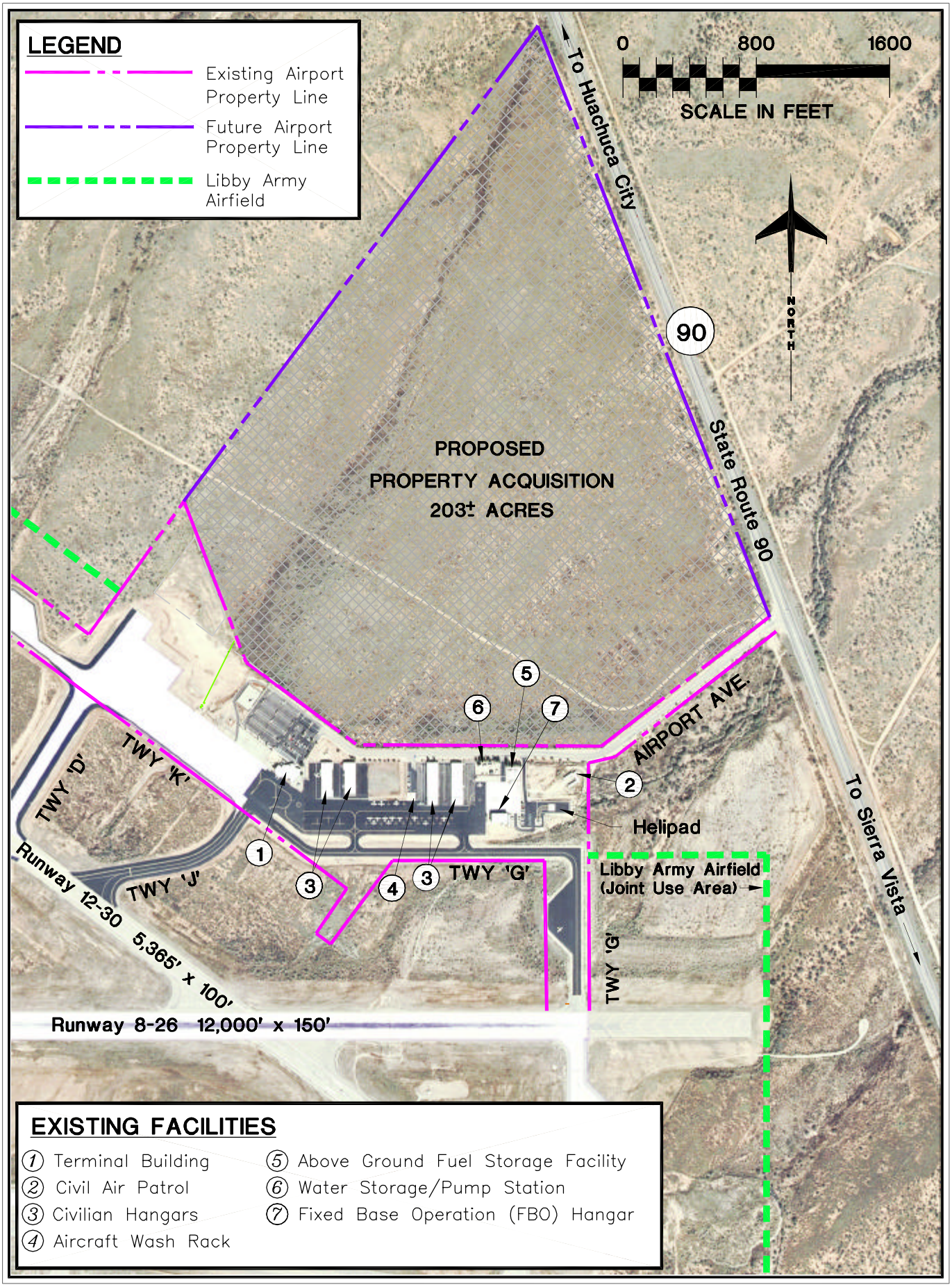
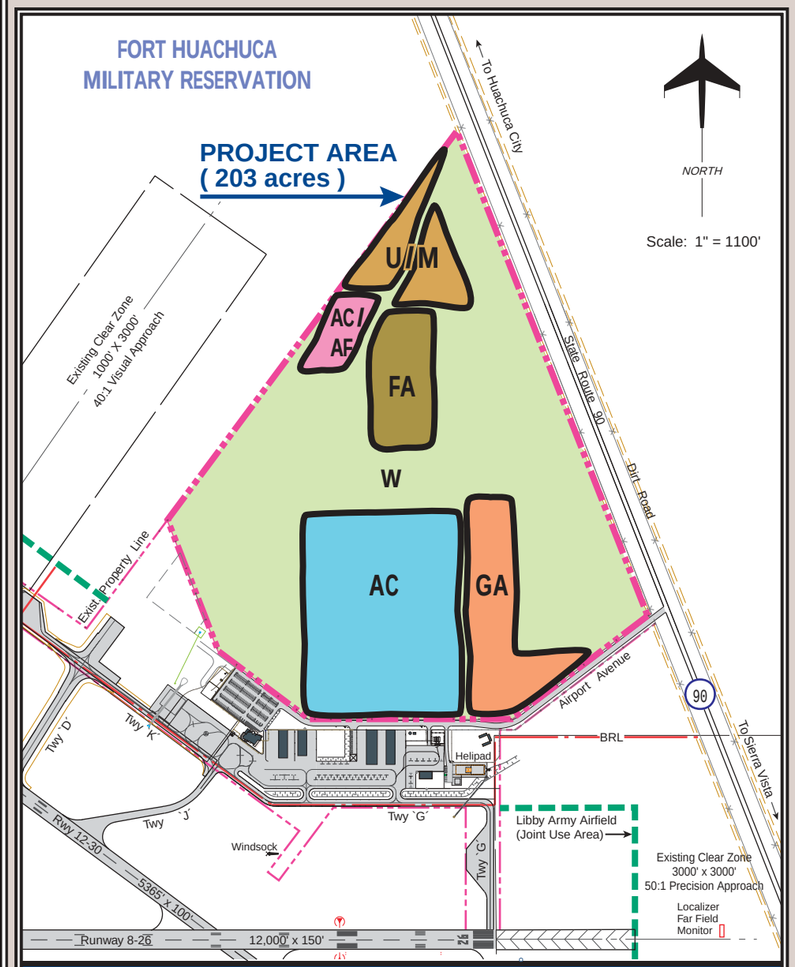
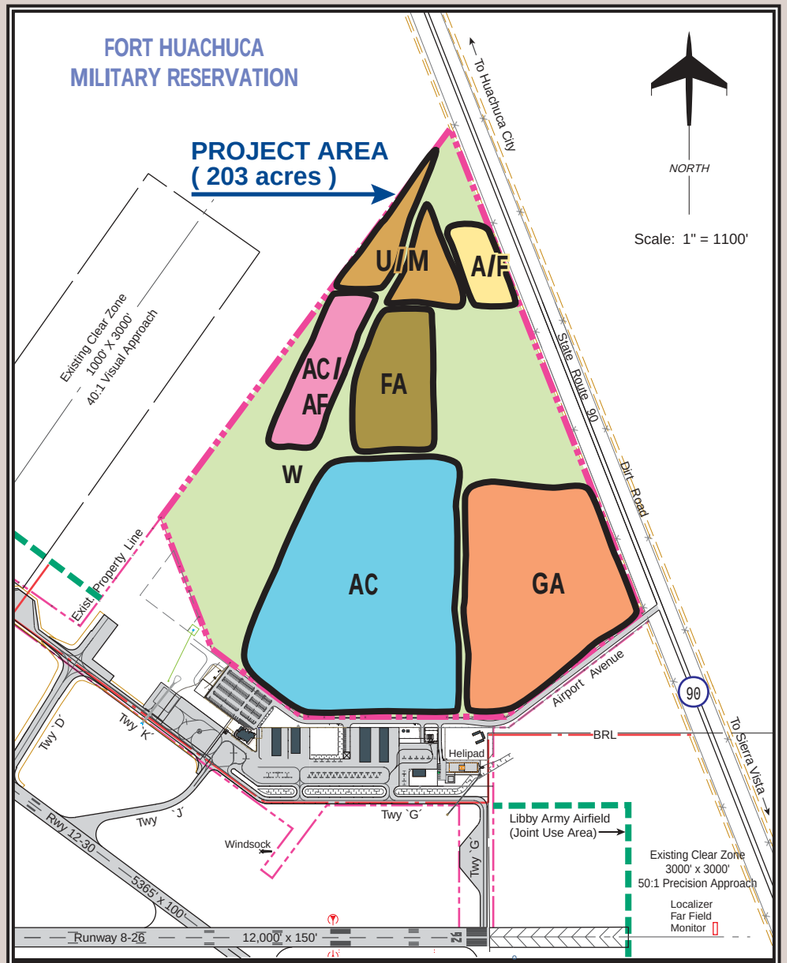


Exhibit 4A
PROPOSED PROPERTY ACQUISITION AREA

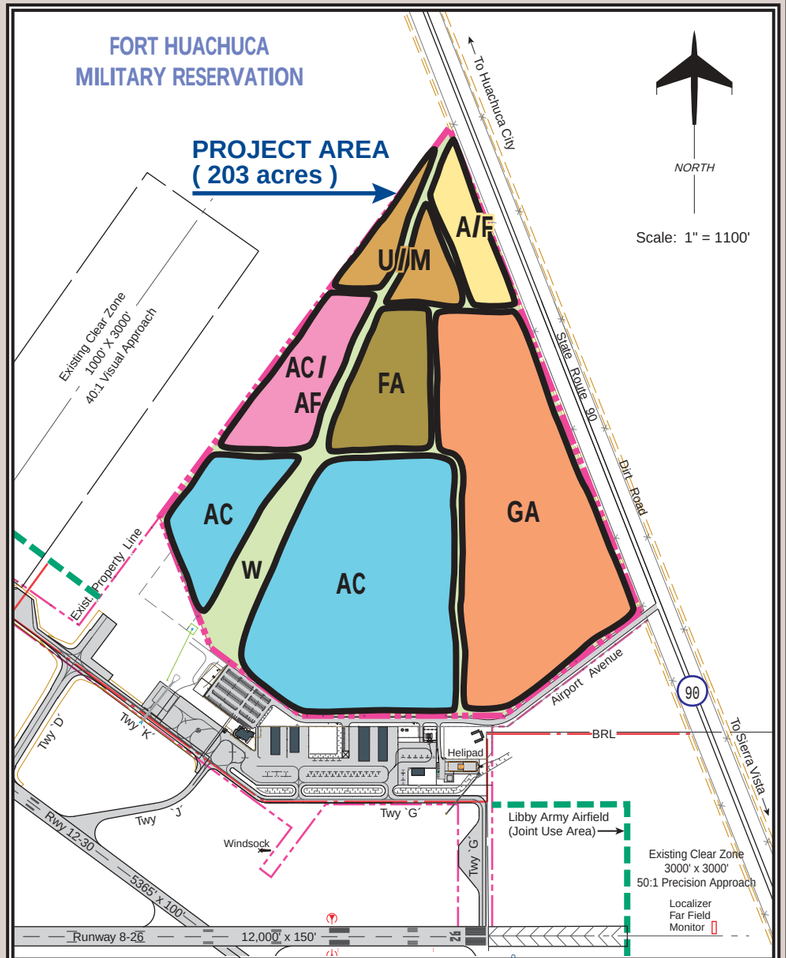
00MP06-4B-8/22/02



40 PERCENT DEVELOPMENT



70 PERCENT DEVELOPMENT



100 PERCENT DEVELOPMENT

LEGEND: (Development per Use)

GA	General Aviation Facilities	A/F	Assembly/Fabrication
AC	Aircraft Conversion Facility	AC/AF	Air Cargo/Air Freight
FA	Federal Agencies	W	Wash/Natural Area
U/M	Utilities/Miscellaneous		

NOTE:

This exhibit is for illustration purposes only and is not intended to reflect a final design.

Sierra Vista municipal airport

Exhibit 4B
DEVELOPMENT SCENARIOS

purpose of reviewing the relative merits of each, as well as the impacts of the implementation of each alternative on the existing airport facilities, environs, and surrounding community.

TABLE 4A
Estimated Development Acreages per Use

User/Use	Transfer/Development of 203 Acres		
	40% Developed	70% Developed	100% Developed
General Aviation Facilities	15	37.5	60
Aircraft Conversion Facility	40	57.5	75
Federal Agencies	10	12	14
Utilities/Miscellaneous	15	15	15
Assembly/Fabrication	0	4.5	9
Air Cargo/Freight	5	10	15
Total Developed Acres	***85***	***136.5***	***188***
Wash/Natural Area	118	66.5	15
TOTAL	**203**	**203**	**203**

Source: *Final Environmental Assessment for the Transfer and Development of 203 Acres of Property Adjacent to Sierra Vista Municipal Airport, Sierra Vista, Arizona.* October 2001.

PREVIOUS MASTER PLAN

The previous airport master plan was completed in November 1995. Although improvements were proposed for both airside and landside facilities at the Airport, as with this master plan, the 1995 Master Plan focused mainly on landside development improvements.

Since the release of the previous Master Plan, due to changes in magnetic declination, the runway number designations for Runways 11-29 and 2-20 have been revised to Runways 12-30 and 3-21, respectively.

As a joint-use facility, Sierra Vista Municipal Airport/Libby Army Airfield airside facilities are operated and maintained by the U.S. Army. Any airside improvements must be approved by the military. As such, the airside improvements recommended in the 1995 Master Plan were designed according to DOD standards, most particularly, the separation standards between Runway 8-26 and the proposed parallel taxiway. Airside recommendations included the construction of a 75-foot wide partial-length parallel taxiway located north of Runway 8-26, the extension of Taxiway D to intercept both Runway 12-30 and Taxiway K, and the realignment of Taxiway J with the proposed parallel taxiway. The main purpose of the parallel taxiway is to provide increased separation between civilian and military aircraft, and to allow aircraft using Runway 8-26 to avoid taxiing on the two crosswind runways. Included

with these improvements would be new taxiway lighting (MITL) and taxiway markings. As of this publication, only the Taxiway D extension has been constructed while the proposed parallel taxiway along with the Taxiway J extension is still in the engineering design stage.

Additional airside improvement recommendations from the 1995 master plan included upgrades to navigational aids for all three runways at the airport. This entailed (1) relocating the VOR from its present location east of Runway 3-21 to the TACAN location east of Taxiway D1 and combining this equipment to form a VORTAC facility; (2) designating nonprecision GPS approaches to each end of Runways 8-26 and 12-30; (3) replacing the existing VASI-4s on Runway 8-26 with PAPI-4s; (4) installing PAPI-2s to Runway 3-21; and (5) installing REILs to Runways 8-26 and 12-30. Of these, only the installation of PAPI-2s to Runway 3-21 and REILs on Runways 8-26 and 12-30 have been completed.

The city-owned, civilian landside facilities are situated on approximately 72 acres of land located northeast of Runway 12-30 at Sierra Vista Municipal Airport. As with this master plan, the recommended landside development from the 1995 Master Plan were based on forecast civilian facility requirements. Improvements included provisions for increased aircraft storage hangar and T-shade facilities, additional aircraft tiedowns, automobile parking, fuel storage capacity, heliport area, large aircraft wash rack and deicing facilities, reserved areas for commercial terminal expansion, and the relocation of the U.S. Forest Service facilities from their present location on the military ramp to a new facility on the civilian side of the airfield. Since completion of the master plan, the city has added 26 hangars, 8,211 square yards of apron (for heavier aircraft), tiedowns, a helipad, and a wash rack. Of the original 72 acres, approximately 14.75 acres remains undeveloped. As much of this remaining acreage would be necessary to provide taxiway access to any additional land, it has not been identified for short-term development.

The 1995 Master Plan identified the acquisition of 199 acres of DOD property located north of the civilian landside facilities area. This 199-acre property acquisition is the same as that currently subject to review under NEPA. At that time, emphasis was placed on defining future land uses for this area and not the actual future development details. A large part of the landside alternatives proposed for the current master plan update, however, will focus on the future layout and development of this 203 acres. As stated in the EA, *'The purpose of the land transfer and development is to accommodate continued use of Sierra Vista Municipal Airport and continued growth within the region. The need for the property is the imminent build-out of the 72 acres previously transferred from the Department of the Army to the city of Sierra Vista for a civilian airport and the demand for additional facilities."*

AIRPORT DEVELOPMENT OBJECTIVES

It is the overall objective of this effort to provide a balanced airside and landside complex to serve projected civil aviation demands. Before defining specific alternatives, however, development objectives must first be defined. The City of Sierra Vista provides the overall guidance for the operation and development of civil aviation facilities at Sierra Vista Municipal Airport. Therefore, it is most important that the Airport be marketed, developed, and operated for the betterment of its users. Consequently, the following objectives have been defined:

- Develop an attractive, efficient, and safe aviation facility in accordance with federal safety regulations.
- Promote the increased use of the Airport for the transportation of air passengers.
- Develop facilities to support potential increased air cargo use of the Airport.
- Develop facilities to efficiently serve general aviation users and encourage increased use of the Airport, including increased business and corporate utilization of the Airport.
- Provide sufficient airside and landside capacity through additional facility improvements which will meet the long term planning horizon level of demand of the area.
- Increase the Airport's self-sustaining ability by targeting local economic development through the development of available property.

The remainder of this chapter will describe various development concepts for the airside and landside alternatives. Within each of these areas, specific facilities are required or desired. Although the development of each area is treated differently, planning must integrate the individual requirements so that they complement each other. In addition, development of facilities should be undertaken in a way that minimizes operational constraints. Flexibility in development at the Airport is essential in order to assure adequate capacity while minimizing financial commitment until market potential is realized. **Exhibit 4C, Planning Considerations,** summarizes the primary airside and landside planning issues related to the Airport. These issues are the result of analyses conducted previously in Chapter Two, Aviation Demand Forecasts, and Chapter Three, Aviation Facility Requirements. These issues have been incorporated into a series of development alternatives. The following sections describe in specific detail the requirements considered in the development of the airside and landside alternatives that follow.

AIRFIELD CONSIDERATIONS

By their very nature, airfield facilities are the focal point of the airport complex. Due to their primary role and

the fact that they physically dominate airport land use, airfield facility needs are often the most critical factor in the determination of airport development alternatives. Particularly, the runway system requires the greatest commitment of land area and often imparts the biggest influence on the identification and development of other airport alternatives. Due to its joint-use facility status and the nature of aircraft operations at Sierra Vista Municipal Airport/Libby Army Airfield, a number of military and FAA design requirements must be considered when examining airfield improvements. These requirements can often have a substantial impact on the feasibility of various alternatives designed to meet airfield needs. In Chapter Three, the adequacy of the existing runway lengths, widths, pavement strengths, and orientations were analyzed with regard to airfield capacity and safety. These needs can frequently change, as over time, new aircraft are introduced into the fleet mix of aircraft utilizing an airport. The assessment of the current airfield configuration, however, indicated that the existing length, width, strength, and orientation of the Airport's runways are sufficient to serve the civilian fleet mix through the planning period. The facility requirements analysis, however, did identify runway approach, navigational aid, airfield lighting, and taxiway improvements which would enhance both civilian and military operations at Sierra Vista Municipal Airport. These improvements are described in the following sections.

RUNWAY APPROACH, NAVIGATIONAL AID, AND AIRFIELD LIGHTING IMPROVEMENTS

As noted in Chapter Three, the Airport is served by three runways. Runway 8-26 is the main runway serving both military and civilian aircraft while Runways 12-30 and 3-21 function as the crosswind runways.

Currently, Runway 26 has a CAT I ILS (instrument landing system) approach with 200-foot decision height, 3/4-mile visibility minimums. This system consists of a localizer antenna and glide slope antenna. The proposed installation of a MALSR approach light system to Runway 26 would reduce the approach minimums to 200-foot, ½-mile visibility. This would meet the Airport's desire for improved poor visibility operations capacity and be in line with recommendations put forth in the *Navigational Aids and Aviation Special Services Study* (dated March 1999) by the Aeronautics Division of ADOT, which also proposed the installation of the MALSR system to Runway 26 to reduce approach visibility minimums. Supplemental non-precision GPS approaches are also recommended for Runway 8-26.

Additionally, for Runway 8-26, the existing VASI-4s (visual approach slope indicator system) should be replaced by PAPI-4s (precision approach path indicators). This allows the Airport to comply with the FAA's nationwide recommendation that all VASI systems be upgraded to newer, more sophisticated PAPI systems.

AIRFIELD CONSIDERATIONS

- Separate military and civilian operations, and relieve taxiway/runway traffic congestion via airfield taxiway improvements
- Comply with nationwide FAA recommended replacement of all VASI systems (Runway 8-26) by more sophisticated PAPI systems
- Provide nonprecision GPS approaches and related approach lighting systems to Runways 8-26 and 12-30
- Provide/establish GPS approaches (one mile visibility minimums) to Runway 3-21
- Install runway end identification lights (REILs) to Runway 3-21

COMMERCIAL SERVICE TERMINAL FACILITY CONSIDERATIONS

- Consider long term expansion of existing building
  - Provide additional administrative space
  - Provide/maintain concession area expansion (future) capability
  - Provide/maintain baggage claim area expansion (future) capability

GENERAL AVIATION (GA) CONSIDERATIONS

- In the existing GA area north of Runway 8-26
  - Provide/expand GA terminal amenities (pilots lounge/flight planning & passenger waiting areas)
  - Provide for expanded helipad/helicopter parking area facilities
  - Relocate certain facilities/services presently housed in modular or temporary structures to more permanent facilities (i.e., new GA terminal/FBO facilities in new property acquisition area)
  - Provide additional FBO or storage hangar facilities

PROPERTY ACQUISITION AREA CONSIDERATIONS

- Provide taxilane access to airfield
- Provide access road(s) to service the development of 203 acres of property acquisition
- Provide dedicated areas (sites) for aviation-related and nonaviation-related development including:
  - General Aviation Terminal Facilities and Development/Expansion Area
  - Aircraft Conversion Facilities
  - Federal Agencies
  - Air Cargo Facilities
  - Nonaviation-related Assembly and Fabrication
  - Wastewater Treatment Facilities/Utilities
  - Wash/Natural Areas

Sierra Vista municipal airport

Exhibit 4C
PLANNING CONSIDERATIONS

Proposed Runway 12-30 improvements include the establishment of a nonprecision approach along with the installation of a related ODALS (Omnidirectional Approach Lighting System) approach light system. The ODALS system consists of seven omnidirectional lights located in the approach area of a nonprecision runway. The installation of the ODALS will improve approach visibility minimums for this runway from the current 400-foot cloud ceiling and one-mile visibility approach minimums to 300-foot cloud ceiling and 3/4-mile visibility minimums.

Runway 3-21 proposed improvements include the implementation of a GPS approach with a 400-foot cloud ceiling and one-mile visibility approach minimum, and the installation of runway end identification lights (REILs) to each end of the runway. An approach of this type requires no supplemental equipment and can be established at no cost to the Airport. The REILs aid pilots in making rapid and positive visual identification of the approach end of the runway.

TAXIWAY IMPROVEMENTS

The primary purpose of taxiways is to facilitate aircraft movements to and from the runway system. A well-designed, efficient taxiway system, therefore, not only improves airfield safety but contributes to optimizing the capacity of the airfield by minimizing delays caused by ground traffic congestion such as taxiing aircraft across active runways. With that in mind, the taxiway improvements recommended for Sierra Vista Municipal Airport/Libby Army Airfield focus on separating military and civilian operations at the airport and eliminating civilian aircraft crossings of active runways.

As previously discussed, several taxiway improvements proposed in the 1995 Master Plan have yet to be completed. One of these is the construction of a 75-foot wide partial-length parallel taxiway to be located north of Runway 8-26. Again, the main objective of the parallel taxiway is to provide increased separation (based on DOD standards) between civilian and military aircraft, and to allow civilian aircraft using Runway 8-26 to avoid taxiing on the two crosswind runways. This parallel taxiway is to be located 1,034 feet (centerline-to-centerline) north of Runway 8-26. DOD standards specify a runway/taxiway separation distance of 500 feet based on "runway lateral clearance zone;" however, Libby Army Airfield has requested a minimum of 1,000 feet because it serves a variety of DOD agencies, some of which require the greater distance. Terrain restrictions have increased this distance to the 1,034 feet described above. Other improvements related to the construction of the parallel taxiway include the construction of connector taxiways A1, B1, and the realignment of Taxiway J. The new parallel taxiway requires the realignment of Taxiway J to ensure an efficient and smooth intersection (transition) between the two taxiways. Other military standards followed in the design of the other taxiways described above include a taxiway width of 75 feet. Class B Runway DOD standards were utilized

in the design of these taxiways. Corresponding FAA standards to military Class B would be Aircraft Design Group (ADG) IV. Finally, each of the new or realigned taxiways at the Airport will also receive both edge and centerline taxiway markings as well as medium intensity taxiway lighting (MITL).

Due to the limited number and nature of the proposed improvements, it was not necessary to create separate airside development scenarios; therefore, each of the above airside development improvements is illustrated on **Exhibit 4D, Airside Improvements**. These airfield-related improvements will serve to enhance both the capacity and safety of civilian and military operations thus improving the overall efficiency and value of the Airport.

LANDSIDE CONSIDERATIONS

As noted in Chapter Three, landside facilities are those facilities necessary for the handling of aircraft, passengers and freight on the ground. The primary landside facilities at the Airport can be grouped into two categories; Commercial Service Facilities and General Aviation Facilities. Commercial Service Facilities include the commercial service apron and gate position area, commercial terminal building, and terminal area auto parking for the public and employees. General Aviation Facilities consist of aircraft storage hangars, aircraft parking aprons, general aviation terminal facilities, and automobile parking areas. A third consideration at Sierra Vista Municipal Airport is the need for a thoughtfully planned, overall development scenario for the anticipated 203-acre acquisition area. Several of the functions or entities described above under General Aviation Facilities are proposed for and can be accommodated in this area. Additionally, other development of both an aviation-related and nonaviation-related nature are also proposed for this area.

Finally, there are other various support facilities at Sierra Vista Municipal which relate to the overall safety and operation of the Airport. These include aircraft rescue and firefighting (ARFF), fuel storage facilities, aircraft wash rack, aircraft deicing facility, and airport maintenance. These existing support facilities have been determined to be adequate for the length of the planning period.

The interrelationship of each of the preceding functions is critical in defining a long range landside layout for the Airport. Landside uses need to be grouped with similar or compatible uses. Other functions should be separated, or at least have well defined boundaries for reasons of safety, security, and efficient operation. Finally, each landside use must be planned in conjunction with the airfield, as well as ground access that is suitable for that function. Runway frontage should be reserved for those uses with a high level of airfield interface, or need for exposure. Other uses with lower levels of aircraft movement, or little need for runway exposure can be planned in more isolated locations. The following sections briefly describe the

00-MP-06 06/28/2002

ADDITIONAL IMPROVEMENT ITEMS:

- Establish nonprecision GPS approaches to Runways 8–26 and 12–30.
- Establish GPS approaches (one mile visibility minimums) to Runway 3–21.

TO HUACHUCA CITY

NORTH

PROPOSED LAND ACQUISITION 203± ACRES

EXISTING CLEAR ZONE 1000' X 3000' 40:1 VISUAL APPROACH (BOTH ENDS)

EXISTING CLEAR ZONE 1000' X 3000' 40:1 NONPRECISION APPROACH (BOTH ENDS)

ELEVENMILE ROAD

Electronic Measuring Site

FORT HUACHUCA MILITARY RESERVATION

Dirt Road

Ult. ODALs

Windsock (Typ)

REILs

TWY 'K'

PAPI-4

TWY 'D'

Vor (To Be Relocated)

AIRPORT AVE.

90

TO SIERRA VISTA

BRL

Helipad

TWY 'G'

ULTIMATE 50' WIDE PARALLEL TAXIWAY

Ult. REILs

RWY. 3-21 4300' X 75'

PAR/ASR Antenna + ARP

TWY 'J'

RUNWAY 12-30 5365'x100'

AWOS

Ult. PAPI-4

Ult. MALSR

Localizer Far Field Monitor

Localizer Antenna

EXISTING CLEAR ZONE 3000' X 3000' 50:1 PRECISION APPROACH

REILs

Vasi-4

Reflector

RUNWAY 8-26 12,000' X 150'

Vasi-4

Reflector

Localizer Shelter

Ult. PAPI-4

RSU

Arresting Gear

West Helipad

TWY 'A'

TWY 'B'

NDB

TWY 'C1'

TWY 'D1'

Delta Helipad

Tacan (Ult. VORTAC)

Echo Helipad

G.S. Antenna

RSU

PAPI-4

TWY 'F'

REILs

EXISTING CLEAR ZONE 3000' X 3000' 50:1 PRECISION APPROACH

Main Taxiway

Automated Weather Station (AWOS)

West Ramp

TWY 'C2'

Charlie Helipad

TWY 'D2'

TWY 'E'

SOUTHEAST TAXIWAY

South Ramp

Main Ramp

Radio Transmitter Site

Compass Rose

Aero Club Ramp

POL

AN/FPN 66 ASR Radar Site

Airport Rotating Beacon

0 1200 2400

SCALE IN FEET

LEGEND

- Existing Airport Property Line
- Future Airport Property Line
- Building Restriction Line (BRL)
- Libby Army Airfield (Joint Use Area)
- Future Libby Army Airfield (Joint Use Area)

NOTE:

Clear Zones depicted on this exhibit are based on military design and safety standards as prescribed in Air Force Manual 32–1123(I)/Army Technical Manual TM 5–803–7, Airfield and Heliport Planning and Design (Revised 5/1/1999).

Sierra Vista municipal airport

Exhibit 4C
Airside Improvements

landside requirements and proposed improvements for Sierra Vista Municipal Airport.

COMMERCIAL SERVICE TERMINAL BUILDING CONSIDERATIONS

The passenger terminal building at an airport is the primary interface between surface and air transportation. As such, its main purpose is to provide for the safe, efficient, and comfortable transfer of passengers and their baggage to and from aircraft and to various methods of ground transportation. To accomplish this, a passenger terminal building must contain several essential components to include ticketing, passenger processing, and baggage handling. These functions are supported by concessions areas, restrooms, airlines offices, and often, airport administrative offices.

The facility requirements analysis conducted in Chapter Three revealed that, with minor modifications the existing commercial service building at Sierra Vista Municipal Airport meets the requirements necessary through the long term planning horizon. While the overall size (6,983 s.f.) of the existing facility is adequate, internally there is a need for additional administrative space (300 to 500 s.f.), expansion of the baggage claim area (to 800 s.f.), and an ability to provide for the future expansion of the concession area. These internal needs can most likely be met through subtle changes in the existing layout of these areas as demand warrants.

GENERAL AVIATION CONSIDERATIONS

The primary general aviation functions to be accommodated or expanded at Sierra Vista Municipal Airport include general aviation terminal facilities, vehicle parking/access, additional aircraft storage hangars, additional apron and aircraft parking apron area, FBO facilities, expanded helipad and helicopter parking area, and the provision of pilots lounge/flight planning and passenger waiting areas. Some of these requirements can be fulfilled utilizing existing facilities or space in the existing general aviation area located north of Runway 8-26. A large portion of the proposed general aviation improvements have been, by necessity, incorporated into the proposed 203-acre property acquisition area. This is due to limited remaining available space in the original 72-acre city-owned landside facilities area.

General Aviation Terminal Facilities: General aviation facilities have several functions including: providing space for a pilots lounge; flight planning; concessions; administrative/management; storage; and various other functions. In the case of new facilities, utility services as well as vehicle parking areas may often be required as well.

At present, there is no dedicated general aviation terminal building at Sierra Vista Municipal Airport. A total of 1,240 square feet of space is currently provided by the Fixed Based Operator (FBO) at the airport to serve the general aviation terminal requirements.

Based on available terminal space and planning standards, the current FBO terminal space is sufficient for existing and short term demand; however, forecast intermediate and long term demands identify an increased GA use of the Airport thus requiring a larger facility of approximately 2,500 square feet in the long term. In terms of immediate needs, both Airport management and users have expressed a desire for pilots lounge, flight planning and passenger waiting facilities. The preferred location of these facilities is the existing general aviation area located north of Runway 8-26, and could be accomplished through expansion of the existing FBO facility (Double Eagle Aviation) located there. Long term planning, however, recommends locating a larger, more comprehensive and permanent general aviation terminal facility in the dedicated GA area of the proposed 203-acre acquisition area.

Vehicle Parking and Access: In Chapter Three it was noted that existing dedicated general aviation parking needs were currently falling short; however, it was further noted that these needs could be satisfied by utilization of excess parking spaces in the commercial terminal parking area. The commercial terminal parking area is close in proximity to the existing GA hangar areas and could provide immediate short term and intermediate parking solutions for those aircraft storage facilities. Any new GA terminal facilities or storage hangar construction will, however, require the development of dedicated parking areas to properly service those facilities. Proposed GA vehicle parking areas are reflected on each alternative layout.

With regard to vehicle access, the existing GA area and commercial service terminal area are both presently accessed via Airport Avenue which further connects the Airport to State Route 90. This access road is adequate given the existing Airport landside configuration; however, additional access roads would be required to service new development alternatives within the property acquisition area as depicted on select alternatives presented later in this chapter.

Aircraft Storage Hangars: The facility requirements analysis indicated the need for additional aircraft storage facilities at Sierra Vista Municipal Airport. The analysis concluded the need for an increase in both single hangar positions (T-hangars) and executive or conventional hangar positions. Smaller clearspan or box type hangars can also be utilized to fill projected aircraft storage demands. Currently, aircraft storage is available in the four hangar structures and FBO facility located off the aircraft parking apron/tiedown area north of Runway 8-26. Additional storage facilities (including provisions for future FBO sites) designed to meet future demand are planned for the GA Development Area illustrated on each landside alternative. In addition, each alternative proposes new aircraft storage facilities for an existing open area which is situated (east-west) between the existing hangar facilities and south of Airport Avenue.

Apron: The existing apron area and number of aircraft tiedowns are sufficient through the short term and intermediate planning horizons. Long term demands forecast in Chapter Three can be met by the development proposed for the GA area depicted on each landside alternative. Each of these alternatives provides sufficient expansion capability which meets or exceeds those requirements identified in the facility requirements analysis. Furthermore, this would allow a portion of the existing GA apron to be utilized/converted to commercial service use should future demand warrant it.

Helipad/Helicopter Parking Area: Presently located east of Double Eagle Aviation and south of the Civil Air Patrol (CAP) facilities, this facility currently offers a single helipad and a single helicopter parking pad. Airport management has indicated there is a demand for expansion of this capability. Each of the alternatives depicts this proposed expansion which would also necessitate the relocation of the CAP facilities to another location. One relocation possibility includes moving CAP to more permanent facilities such as the GA Terminal proposed for the 203-acre property acquisition area.

Other Facilities: As previously noted, additional facilities such as aircraft rescue and firefighting (ARFF), fuel storage facilities, aircraft wash rack, aircraft deicing facility, and airport maintenance exist at the Airport and have been deemed adequate for the planning period. Should future demand warrant it, however, there is sufficient capability to relocate some these existing facilities or construct additional facilities in the GA area proposed for the property acquisition area.

PROPERTY ACQUISITION AREA CONSIDERATIONS

In the EA regarding the transfer and development of the 203 acres from the Department of the Army to the City, alternative development scenarios of a general nature were developed which divided the subject property into general use categories. These categories include: General Aviation Facilities; Aircraft Conversion Facility; Federal Agencies; Utilities/ Miscellaneous; Assembly/Fabrication; Air Cargo; and the Wash/Natural Area. With these uses in mind, these scenarios have been further refined and developed to a greater detail in each of the four landside alternatives presented in this chapter. It is vital to both the City and the Airport that a well planned, logistically possible development plan, which will generate the best financial benefit, be developed for this property. The following subsections describe each of these considerations in greater detail.

General Aviation Facilities: At an airport having both commercial aviation service and general aviation activity, it is desirable to separate these two functions as distinctly as possible. Currently, these functions share basically the same apron and runway access area north of Runway 8-26. With the assumed acquisition of the 203 acres from the DOD, the Airport has an excellent opportunity to separate these two functions into more clearly definable areas. Each of the presented

landside alternatives offers a different concept with regard to the layout and development of this future GA area. The elements comprising this development, however, are essentially the same for each.

Each alternative provides a sizable apron and aircraft parking area with room for future expansion. A dedicated GA terminal facility, FBO sites, and related vehicle parking is typical to each alternative. Aircraft storage hangar facilities designed to satisfy future demand are also provided. These storage facilities include T-hangars, executive hangars, and box hangars. Airfield access to these planned GA facilities is provided by taxilanes on each alternative. Additional ground-access roads are provided where necessary on certain select alternatives.

Aircraft Conversion Facility: Recently, large aircraft conversion operations have expressed interest in locating facilities at Sierra Vista Municipal Airport. Construction of such a facility would be impossible without the anticipated property transfer. This facility would include a large hangar/office complex, ramp/apron area for parking and storage of large aircraft, and an employee/customer parking area. This facility requires airfield access via taxilane. Ground access would be by the existing Airport access road or proposed additional access roads, dependent upon the respective alternative.

Federal Agencies: Currently, there is a U.S. Forest Service (USFS) facility located south of Runway 8-26 on the military side of Sierra Vista Municipal Airport/Libby Army Airfield. There have been ongoing discussions between USFS and the Airport regarding relocation of their facility to the civilian side of the airfield. The preferred location of this facility is off the existing ramp northwest of the commercial terminal building. This location is on existing Airport property, and provides easy and quick airfield access which is required for the large, firefighting air tankers stationed at the USFS facility during the summer fire season. Facility requirements for this relocation would include operation facilities, apron, and maintenance/ storage facilities.

Additionally, other federal agencies including the U.S. Border Patrol/ Immigration and Naturalization Service (INS) Air Operations have expressed interest in constructing a facility at the Airport. Site requirements for this facility include taxilane access, hangar and operations facilities as well as aircraft parking apron.

Ground access to each of these facilities would be by the existing Airport access road or proposed additional access roads, dependent upon the respective alternative.

Air Cargo Facilities: At present, there are no dedicated air cargo facilities or regularly scheduled air cargo operations at the Airport. What small amount of cargo that does move in and out of the Airport does so mainly via scheduled commercial air service flights. In anticipation that future demand may warrant such a facility, however, each landside alternative depicts a future reserved air cargo area. Such a complex would consist of a warehouse and

operations building, airfield taxilane access, ramp and cargo aircraft parking area, auto/truck parking, and ground traffic access.

Nonaviation-Related Assembly and Fabrication: Each alternative sets aside an area for light manufacturing and assembly. Businesses within this area are not necessarily aviation-related; however, they may desire the visibility offered by being located on-airport. These types of facilities require no direct airfield access and can, therefore, be located further from the airside facilities. Locations along future Airport property which would face State Route 90 also provide increased visibility as well as afford easy ground access.

Wastewater Treatment Facilities/ Utilities: As participants in the Upper San Pedro Partnership, an organization of federal, state, and local agencies which are evaluating the overall water supply issue within the Upper San Pedro Basin and making recommendations to alleviate drawdown concerns, both the military and the City have committed to groundwater recharge of treated wastewater. To that end, a wastewater treatment facility site has been set aside on each of the landside alternatives. More information regarding groundwater issues as they may relate to the Airport is available in the EA.

As discussed in Chapter One, the availability of utilities serving Sierra Vista Municipal Airport is critical in determining the development potential of the Airport. Development within the proposed property acquisition area will require that utilities be extended to or provided to this area. Utilities to be considered include electricity, potable water, natural gas, telephone, sanitary sewer, storm sewer/drainage, and solid waste disposal. Chapter One presents a discussion of the utilities currently available on the existing side of the Airport. This discussion details the various components, capacities, and providers of these existing utilities. Chapter Six, Financial Plans, presents an overall estimate of the cost of providing utilities to the proposed property acquisition area. This estimate is formulated on a "cost per acre" basis, and by no means represents a comprehensive utilities cost estimate. The utilities cost estimate presented in Chapter Six is subject to further refinement during the design and construction phase of any development within the proposed property acquisition area.

Wash/Natural Areas: A defined wash separates the majority of the 203-acre property from access to the airfield and will need to be crossed by taxiway(s) and, possibly, roadway(s). These crossings will be accomplished by means of taxiway and/or roadway bridges. Crossings of the wash may require a *Clean Water Act, Section 404* permit or may be covered under provisions of nationwide permits. Details concerning potential impacts to crossing the wash and any related federal requirements may be found in the EA.

LANDSIDE DEVELOPMENT ALTERNATIVES

As previously discussed, the remaining existing area (14.75 acres) available for landside development is limited. Accordingly, the four landside alternatives described in the following sections all assume that the proposed property transfer will receive federal approval.

ALTERNATIVE A

As with each alternative, **Exhibit 4E, Landside - Alternative A,** depicts the development or construction of facilities on both existing Airport property and the proposed property acquisition site. Beginning with the existing landside area, this alternative proposes the expansion of the existing helipad/ helicopter parking area located south of the Civil Air Patrol facility. This expansion will require the relocation of the CAP facilities to another area of the Airport as the existing joint-use agreement requires the City/Airport to provide accommodations for the CAP as long as necessary. One relocation possibility is to the General Aviation Terminal Facility, proposed for the property acquisition area. West of the helipad area is the proposed pilot's lounge/flight planning/passenger waiting facilities location. These functions would be housed in either a building expansion/addition to the existing FBO facility located there. Farther to the west between the aircraft wash rack and Airport Avenue is a currently vacant pad. A FBO/ conventional hangar site is proposed for this site. Northwest of the commercial service terminal parking area is an area reserved for Federal Agencies. This is the preferred relocation site of the U.S. Forest Service facility currently located on the military side of the airfield. Though not illustrated in detail, this site would require operation facilities, apron, and maintenance/storage facilities.

The General Aviation development area depicted on Alternative A fronts both Airport Avenue and State Route 90. Ground access for the GA Terminal/ FBO sites proposed for this area from SR 90 would be via an access road which would enter the property from SR 90. This access road provides the desired separation of general aviation facilities from other unrelated uses located within the proposed property acquisition area. A frontage road skirts the northeast edge of the GA area intersecting the existing Airport access road south of this area. More than ample space is provided for apron and aircraft parking in the area immediately south of these facilities. Taxilane access is provided from the existing GA area south of Airport Avenue via two ultimate taxilanes which are shown southwest of the proposed GA Terminal area. These taxilanes allow airfield access to aircraft which will utilize the various aircraft storage facilities (T-hangars, executive and box hangars) and other GA facilities depicted in the General Aviation area. Construction of these taxilanes would, however, require the closure of a section of Airport Avenue. The new access would then provide access to the commercial service terminal area previously served by Airport Avenue.

00MP06-4E-8/22/02

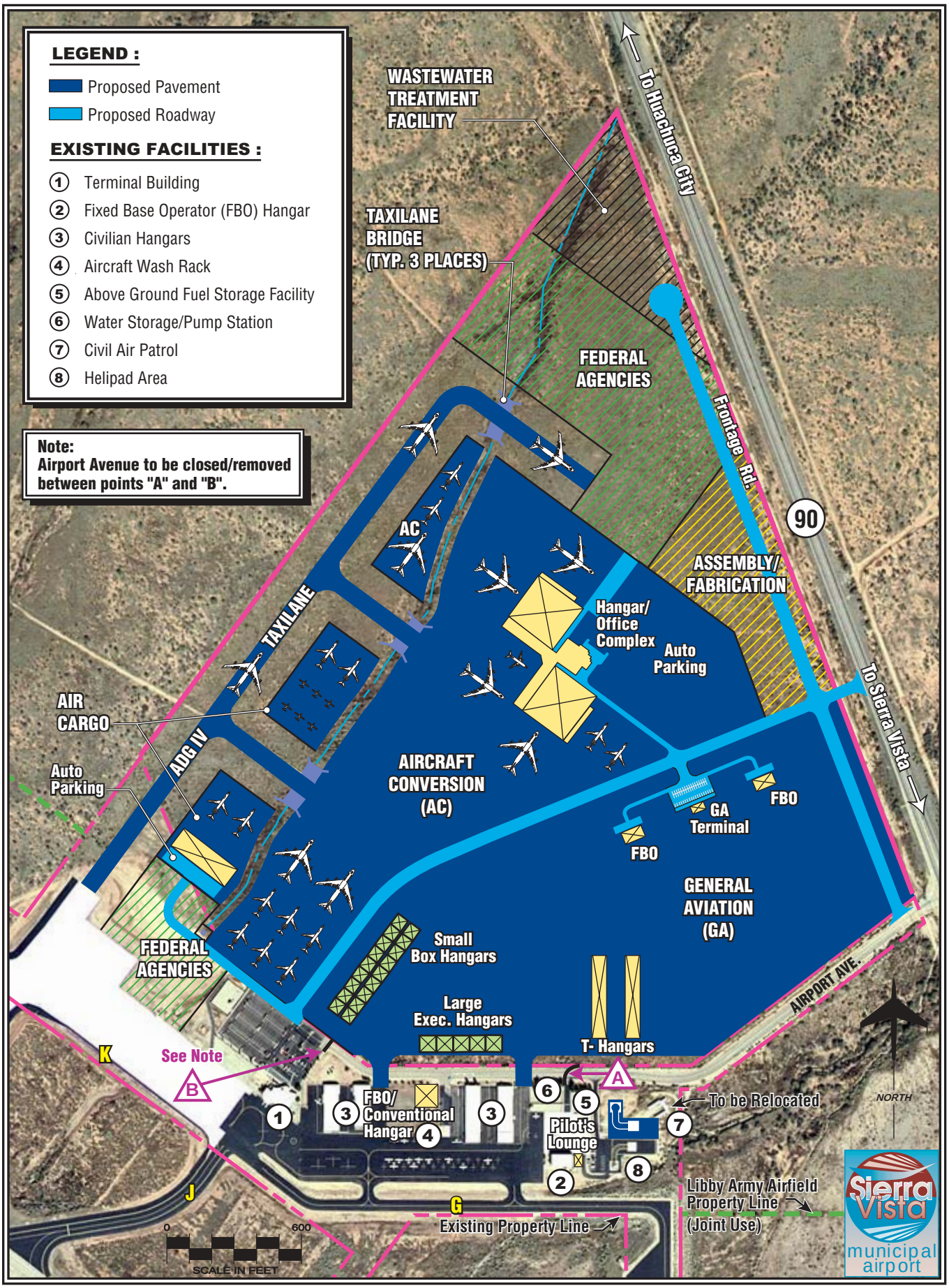


Exhibit 4E
LANDSIDE - ALTERNATIVE A

Located on the opposite side (north) of the proposed access road is the Aircraft Conversion Facility. This site consists of an office/hangar complex offering two large conventional hangars, ramp/apron area and large aircraft parking, and auto parking. There is more than adequate space available in which to maneuver and park several large aircraft. Airside access is provided on the west side of this site by two taxilanes which span the existing wash via bridges.

An additional Federal Agencies site is reserved in the area north of the Aircraft Conversion Facility. This area could be utilized by the previously discussed Border Patrol/INS Facility or other federal agency. This site would have taxilane access which, again, may require a bridge crossing the wash. Ground access would be via the north side frontage road depicted on the exhibit.

West of the Aircraft Conversion site along the proposed ADG IV taxilane is an area reserved for a future Air Cargo complex. As shown on the exhibit, this facility consists of a warehouse/ operations building, apron/aircraft parking area, auto/truck parking. Ground access is via the Airport Avenue extension which would cross the Federal Agencies reserve south of the Air Cargo area.

A nonaviation-related Assembly/ Fabrication use site bordering both the Aircraft Conversion Facility and Federal Agencies sites is reserved along the north frontage road. This use requires no airfield access.

In the extreme northern corner of the proposed property acquisition area is a site reserved for the Wastewater Treatment Facility. As it represents the lowest ground elevation within the property acquisition area, it was determined the best location for this facility. This site would be accessed by the north frontage road.

The primary advantage of Alternative A is that it separates the General Aviation development area from other unrelated uses within the property acquisition area. The two proposed taxilanes crossing Airport Avenue provide GA users with easy access to the existing GA area north of Runway 8-26 and the runway system as well.

The main disadvantage to this alternative would be the construction costs of the taxilane(s) designed to service development on the west-side of the property acquisition area. The preliminary cumulative estimated length of this 75-foot wide taxilane configuration is approximately 4,600 linear feet, and considerable amounts of fill may be needed to maintain the necessary taxilane gradients required for use by Aircraft Design Group IV aircraft. Also, Alternative A would require the construction of three taxilane bridges in order to cross the wash.

ALTERNATIVE B

Like the previous alternative, **Exhibit 4F, Landside - Alternative B,** depicts the expansion of the existing helipad/helicopter parking area located

south of the Civil Air Patrol facility. Again, this expansion will require the relocation of the CAP facilities to another area of the Airport. The pilots lounge/flight planning/passenger waiting facilities location (adjacent to the existing FBO facility) proposed in the previous alternative remains the same for this alternative. Development for the pad located just north of the wash rack area near mid-apron reflects three large executive-type hangars. As with Alternative A, the area northwest of the commercial service terminal parking facility is reserved for Federal Agencies. The site requirements for this reserved area remain the same.

General aviation development for this alternative focuses along the southern boundary of the proposed property acquisition area. Ground access for the GA Terminal/FBO sites and hangar development areas would be from existing Airport Avenue. Taxilane access would border the north side of the GA development area and provide separation from dissimilar uses. Adequate aircraft apron/parking area is available north of the proposed GA Terminal and FBO sites. To the east of the GA Terminal Area is a large area to be reserved for future general aviation expansion. The aircraft storage hangar development area is to be located on the west side of the GA development area. Development in this area consists of T-hangars, executive and box hangars.

The Aircraft Conversion Facility site will be located north of the GA development area. Taxilane access would border the southern section of this development utilizing the same taxiway as the GA development area. The access road for this facility would connect directly to SR 90.

As with the first alternative, a Federal Agencies reserve site is located north of the Aircraft Conversion facility and would receive airfield access via the proposed taxilane which borders the property acquisition area's western boundary. Ground access would be to the east of this facility by way of an access road intersecting with SR 90. Again, this site would accommodate the U.S. Border Patrol/INS Facility or other federal agency.

Located west of the GA area complex is an area reserved for a future Air Cargo Facility. Similar to Alternative A, this site adjacent to the proposed ADG IV taxilane contains a warehouse/ operations building, apron/aircraft parking area, auto/truck parking, and is accessed via the proposed Airport Avenue extension which crosses the Federal Agencies reserve south of the Air Cargo area.

Nonaviation-related Assembly/ Fabrication is located north of the Aircraft Conversion Facility and east of the second Federal Agencies site. This facility utilizes the same ground access road as the second Federal Agencies site.

The Wastewater Treatment Facility is once again located in the extreme northern corner of the proposed property acquisition area. This site shares ground access with the Federal Agencies and nonaviation-related Assembly/Fabrication sites.

00MP06-4F-8/22/02

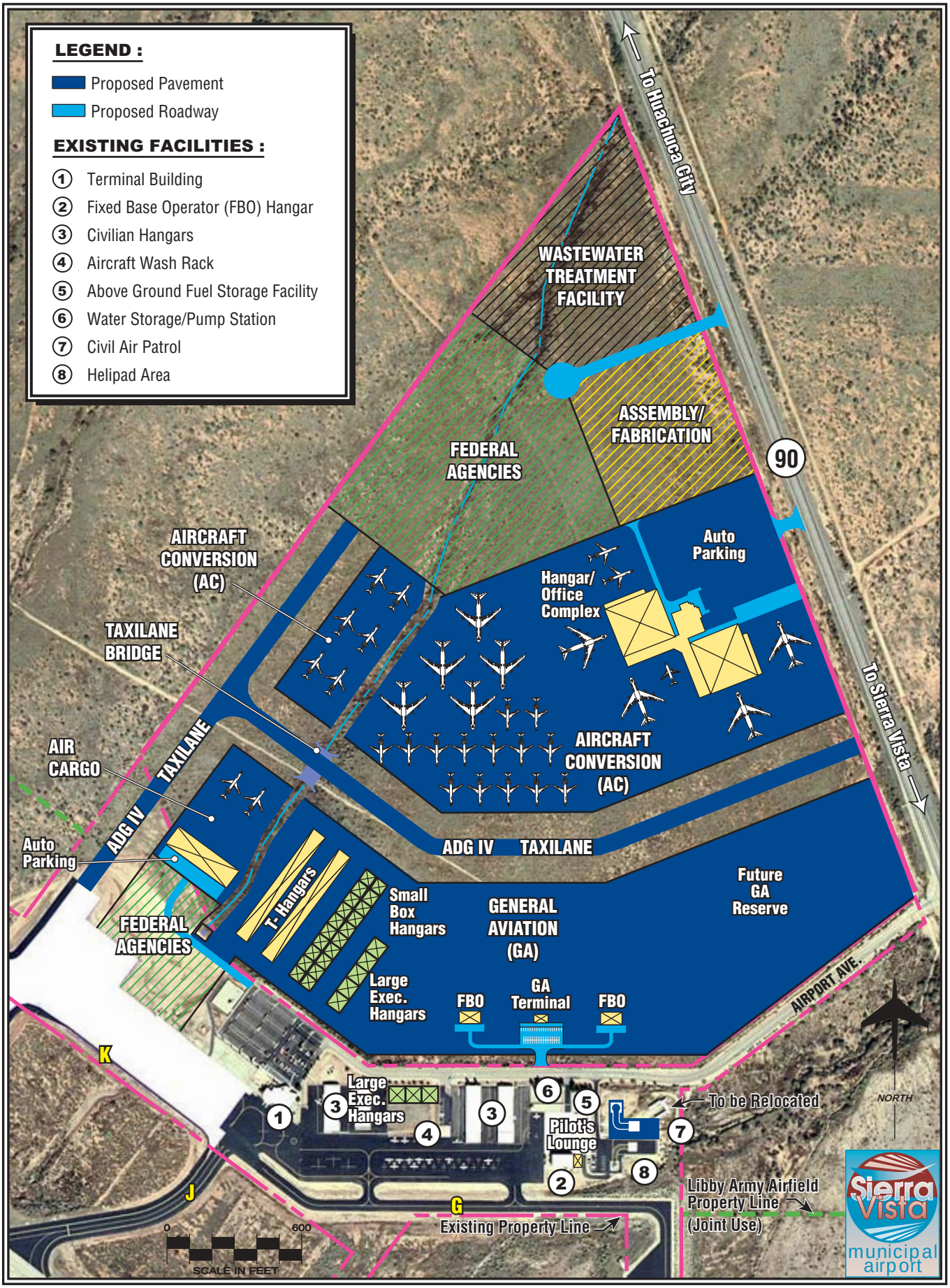


Exhibit 4F
LANDSIDE - ALTERNATIVE B

Similar to the first alternative, but to a lesser degree, this alternative separates the GA development area from other uses. Another advantage is the large GA expansion area located east of the GA Terminal Area. Third, although the estimated cumulative length (approximately 5,100 feet) is more than the taxilane configuration depicted on the first alternative, this alternative requires only one taxilane crossing of the wash area and less earthwork to maintain required gradients. Compared with Alternative A, this taxilane system should result in lower construction costs.

The primary disadvantage to this alternative is expansion capability with regard to the Aircraft Conversion complex which is more limited than the first alternative. As such this alternative was deemed slightly less desirable than Alternative A.

ALTERNATIVE C

As with the first two alternatives, **Exhibit 4G, Landside - Alternative C**, proposes expansion of the existing helipad/helicopter parking area in the area south of the Civil Air Patrol facility. As before, this expansion requires the relocation of the CAP facilities to another location on the Airport. The GA-related pilot's lounge/ flight planning/passenger waiting facilities location (adjacent to the existing FBO facility) proposed in the previous alternatives remains the same for this alternative. Like Alternative A, a FBO/Conventional Hangar site is proposed for the pad located north of the aircraft wash rack and mid-apron area. Also, as with the previous alternatives, the area bordering the commercial service terminal parking facility is reserved for Federal Agencies. The site requirements for this area remain the same.

The General Aviation area for Alternative C proposes development along the eastern edge of the proposed property acquisition area. Ground access for the GA Terminal/FBO site would be from Airport Avenue. The T-hangar development area, meanwhile, would be served by a separate access road connecting to Airport Avenue. The GA area would again share taxilane access with the Aircraft Conversion facility. Aircraft apron/parking area is available north of the proposed GA Terminal and FBO sites. Aircraft storage hangar development areas are located in three separate areas bordering the perimeter of the GA development area. Development in these areas, as with Alternatives A and B, comprises T-hangars, executive and box hangars. To the extreme north of this site is an area set aside for future GA expansion.

The Aircraft Conversion Facility site for this alternative is located west of the GA development area. Again, this site provides for an office/hangar complex with two large conventional hangars, ramp/apron area and large aircraft parking, and auto parking. Shared taxilane access would border the western and northern boundaries of the main complex with an additional aircraft parking apron area located north of the proposed east-west taxilane. Ground access for this facility would be from Airport Avenue as well

as the previously discussed access road serving the T-Hangar development area.

The second Federal Agencies reserve site is centrally located within the property acquisition area. It is bordered on the east by the GA development area, on the west and northwest by Air Cargo and Assembly/ Fabrication sites, and on the south the Aircraft Conversion Facilities. This site shares taxilane access along its southern boundary with both the Aircraft Conversion Facility and the GA development area. Ground access between this site and SR 90 is via the curved access road which runs along its western boundary. As with the previous two alternatives, this site would accommodate the U.S. Border Patrol/INS Facility or other federal agency.

West of the Federal Agencies site is the proposed Air Cargo Facilities area. This area contains a warehouse/ operations building, apron/aircraft parking area, auto/truck parking, and is accessed by the previously described access road bordering the Federal Agencies site. Airfield access is provided by the ADG IV taxilane adjacent to its southern boundary.

The nonaviation-related Assembly/ Fabrication site proposed for this alternative is located north of the Air Cargo Complex and west of the second Federal Agencies site. This facility utilizes the same ground access road as the Federal Agencies and Air Cargo sites discussed above.

Like the other alternatives, the Wastewater Treatment Facility is located in the extreme northern corner of the proposed property acquisition area. This site shares ground access with the Federal Agencies and nonaviation-related Assembly/Fabrication sites.

Other than shorter total taxilane lengths (approximately 3,750 linear feet) and significantly less earthwork (fill) requirements, no distinct advantages are offered by this alternative over the two previous development alternatives.

The primary disadvantage of this alternative is that it positions the GA Development area farther away from the airside part of the Airport than any of the other four alternatives presented here. Another disadvantage is that it splits (via the east-west taxilane) the Aircraft conversion facility into essentially four distinct areas. Part of this separation is due to the natural barrier formed by the wash which bisects the western half of the property acquisition area. Furthermore, this alternative layout requires two bridges be built over the existing wash; one for the main taxilane access to the GA and Aircraft Conversion sites; and one for ground access to the Air Cargo Facility complex. Based on the factors listed here, Alternative C was deemed less desirable than the two previous alternatives.

ALTERNATIVE D

Exhibit 4H, Landside - Alternative D, like the preceding alternatives,

00MP06-4G-8/22/02

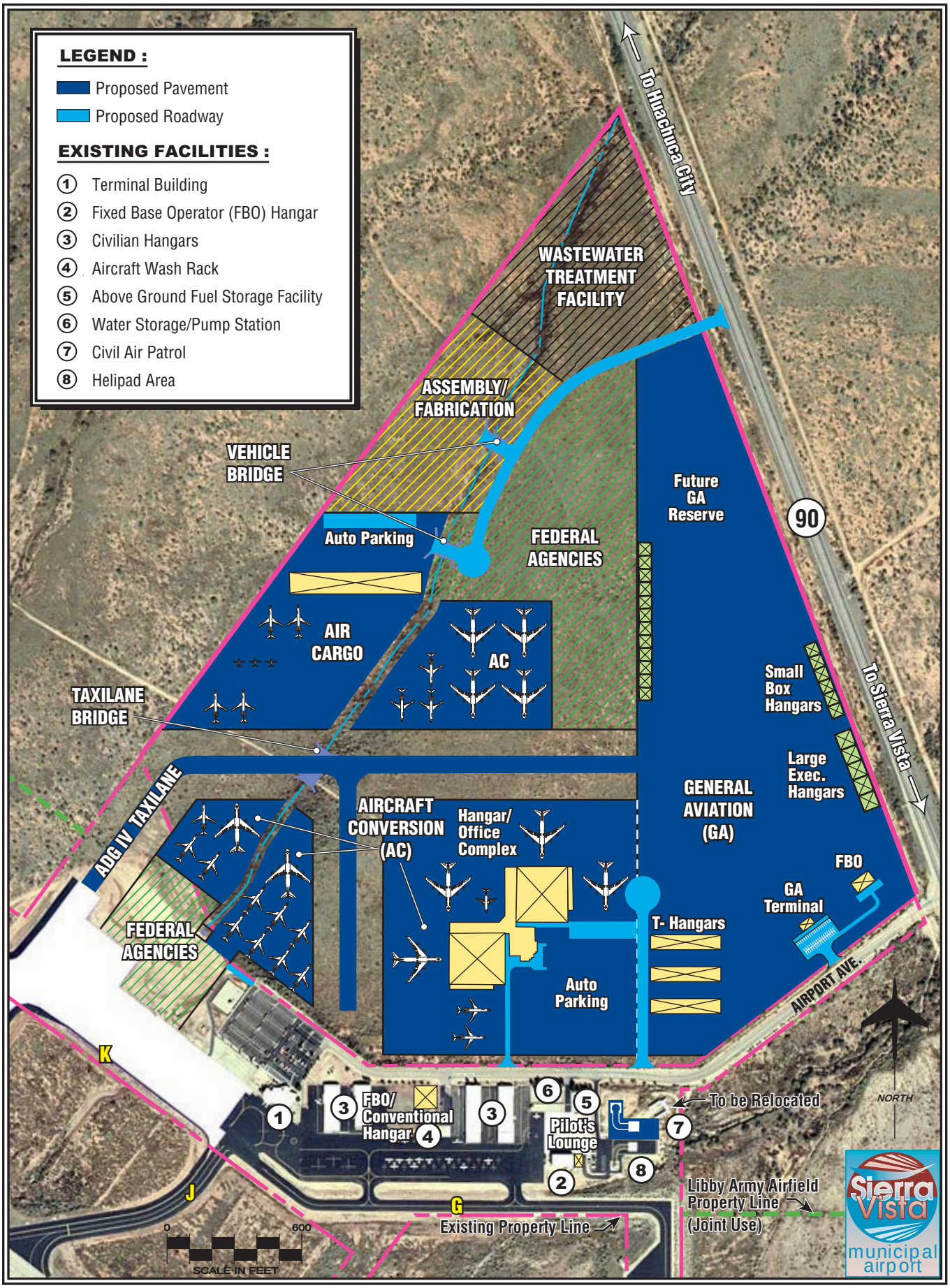


Exhibit 4G
LANDSIDE - ALTERNATIVE C

00MP06-4H-8/22/02

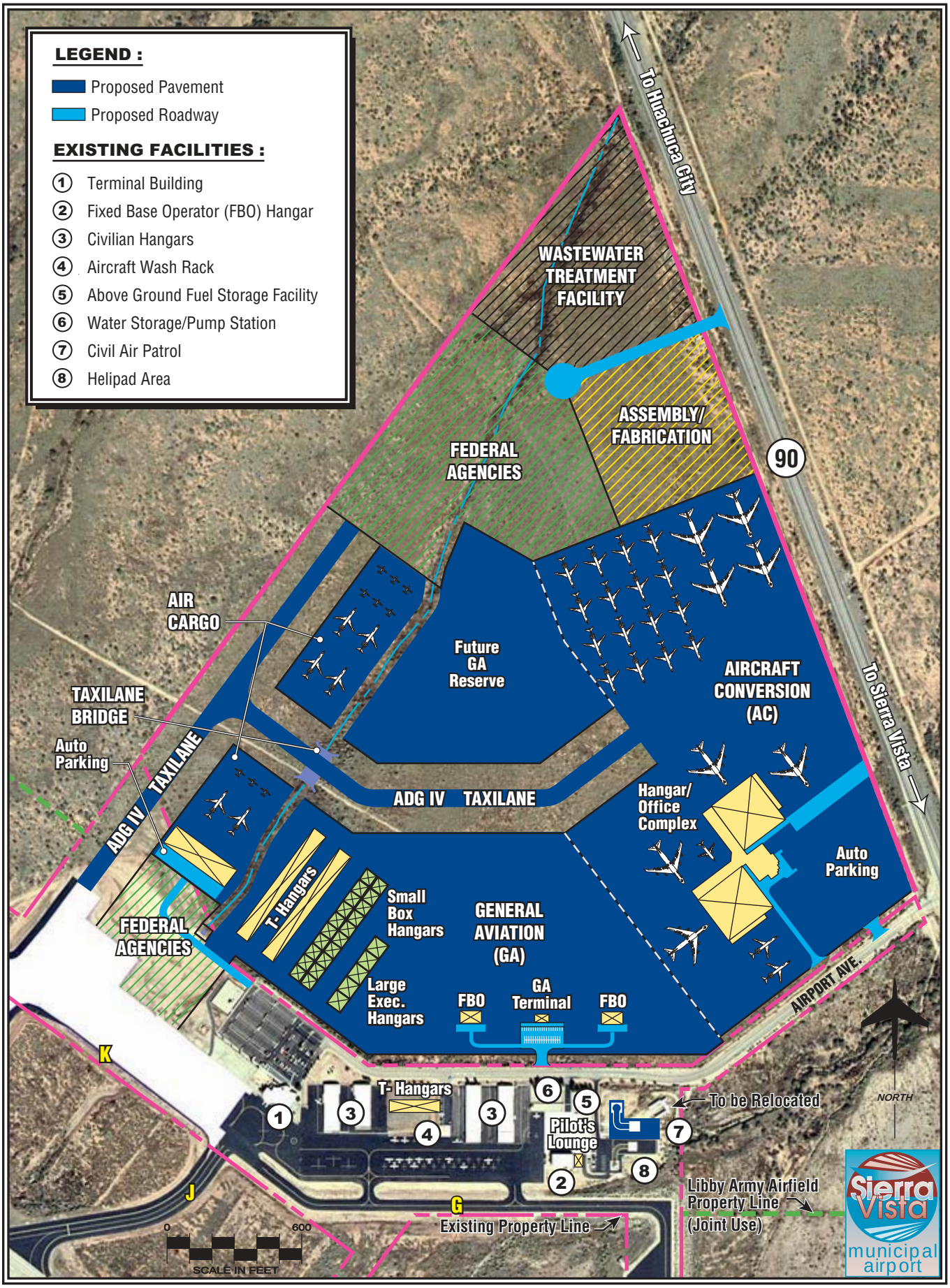


Exhibit 4H
LANDSIDE - ALTERNATIVE D

depicts the expansion of the existing helipad/helicopter parking area in the area south of the Civil Air Patrol facility, and locating the CAP facilities to another location on the Airport. Similarly, it establishes the GA-related pilot's lounge/flight planning/passenger waiting facilities in the same location as each of the previous alternatives. The existing vacant pad located between the aircraft wash rack and Airport Avenue depicts a future T-hangar site. Again, the area northwest of the commercial service terminal parking facility is reserved for Federal Agencies. The site requirements for this area remain the same.

General Aviation development for Alternative D is centrally located along the southern boundary of the property acquisition area. Ground access for the GA Terminal/FBO site is via Airport Avenue. Shared taxilane (east-west) access is north of the main GA development area. A large aircraft apron/parking area is available north of the proposed GA Terminal and FBO sites. Similar to Alternative B, an aircraft storage hangar development area is located west of the GA development area. Development in this area, like Alternative B, consists of T-hangars, executive and box hangars. A sizeable future GA Reserve area is located north of the previously discussed east-west taxilane.

Alternative D depicts the Aircraft Conversion Facility site along the eastern boundary of the property acquisition area. Its is bordered to the west by the GA development area, and to the north by Federal Agencies and Assembly/Fabrication sites. Shared taxilane access is east of the complex. Ground access for this site is from Airport Avenue on the facilities southern boundary.

Along the western perimeter of the property acquisition area is a reserved second Federal Agencies site. Taxilane access is provided south of the site. Ground access to this facility is provided by an access road to the east. Like the preceding alternatives, this site could house the previously discussed Border Patrol/INS Facility or other federal agency.

Located west of the General Aviation development area along the proposed ADG IV taxilane is an area reserved for a future Air Cargo facility. As shown on the exhibit, this facility consists of a warehouse/operations building, apron/aircraft parking areas, auto/truck parking. By ground, this facility can accessed via the Airport Avenue extension which would cross the Federal Agencies reserve south of the Air Cargo area.

The nonaviation-related Assembly/ Fabrication site is located north of the Aircraft Conversion Facility and east of the second Federal Agencies site, and shares the same ground access road as the Federal Agencies site. This site requires no airfield access.

The Wastewater Treatment Facility is again located in the extreme northern corner of the proposed property acquisition area. This site shares ground access with the Federal Agencies and nonaviation-related Assembly/Fabrication sites.

Similar to Alternative C, other than shorter total taxilane lengths (approximately 4,050 linear feet) and significantly less earthwork (fill) requirements, this alternative offers no real advantages over the previously presented alternatives.

The primary disadvantage to this alternative is that the area reserved for GA expansion is separated from the main GA development area by the east-west taxilane. Also, expansion capability for the Aircraft Conversion complex is considerably more limited than Alternatives A and B. Given these considerations, this alternative was deemed less desirable than the previous alternatives.

SUMMARY

The process employed in assessing the airside and landside development alternatives for Sierra Vista Municipal Airport involved a detailed analysis of short and long term requirements as well as future growth potential. Current airport/airfield design standards, both FAA and military, were considered at each stage of development.

Upon review of this report by the Planning Advisory Committee, the City of Sierra Vista, and the U.S. Army, a final Master Plan concept can be identified. The resultant plan will represent an airside facility that fulfills safety and design standards and a landside complex that can be developed as demand dictates.

The proposed development plan for the Airport must represent a means by which the Airport can grow in a balanced manner, both on the airside as well as landside, to accommodate forecast demand. Additionally, it must provide (as all good development plans should) for flexibility in the plan to meet activity growth beyond the 20-year planning period.

The remaining chapters in this report will be dedicated to refining the basic concept into a final plan with recommendations to ensure proper implementation and timing for a demand-based program.